

**AR46**

The AVCO logo consists of a white triangle pointing upwards, positioned to the left of a vertical white bar.

**AVCO**

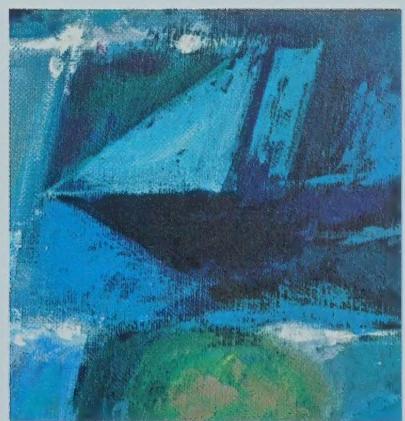
**CORPORATION ANNUAL REPORT 1966**

J. C. COOPER

PRESIDENT  
& GENERAL MANAGER

MOFFATS LIMITED  
WESTON, ONTARIO

MAY - 5 1967



**AVCO** CORPORATION ANNUAL REPORT 1966



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**STOCK TRANSFER AGENT:**

*Schroder Trust Company,  
57 Broadway, New York, New York 10015.*

**REGISTRAR:**

*Bankers Trust Company,  
16 Wall Street, New York, New York 10015.*

**CO-TRANSFER AGENTS:**

*The First National Bank of Chicago,  
38 South Dearborn Street, Chicago, Illinois 60690.  
Bank of America National Trust and Savings Association,  
1 South Van Ness Avenue, San Francisco, California 94120.  
Crown Trust Company,  
302 Bay Street, Toronto, Ontario, Canada.*

**CO-REGISTRARS:**

*Harris Trust and Savings Bank,  
111 West Monroe Street, Chicago, Illinois 60690.  
Wells Fargo Bank,  
464 California Street, San Francisco, California 94120.  
The Canada Trust Company,  
110 Yonge Street, Toronto, Ontario, Canada.*

**TRUSTEE:**

*Convertible Debentures—Bankers Trust Company,  
16 Wall Street, New York, New York 10015.*

**LISTING OF SECURITIES:**

*Common Stock and Convertible Debentures—  
New York Stock Exchange,  
Midwest Stock Exchange.  
Common Stock—  
Toronto Stock Exchange.*

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**ANNUAL MEETING:** The annual meeting of stockholders of Avco Corporation will be held April 13, 1967. Formal advance notice of the meeting will be mailed to all stockholders.

## *Board of Directors*

**Kendrick R. Wilson, Jr.,\*** *Chairman*  
**George E. Allen\***  
**Earl H. Blaik\***  
**James Bruce\***  
**Rudolph H. Deetjen**  
**John R. Gosnell\***  
**Frederick W. P. Jones**  
**Herman H. Kahn**  
**Arthur Kantrowitz**  
**James R. Kerr\***  
**Edward H. Litchfield**  
**John A. McDougald**  
**Matthew A. McLaughlin\***  
**William I. Myers\***  
**Benjamin H. Namm**  
**Arthur E. Rasmussen**  
**Richard W. Yantis**

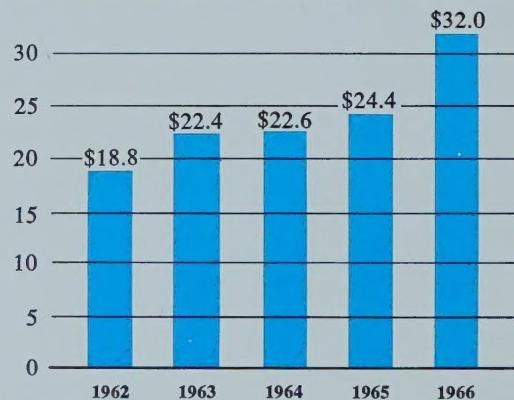
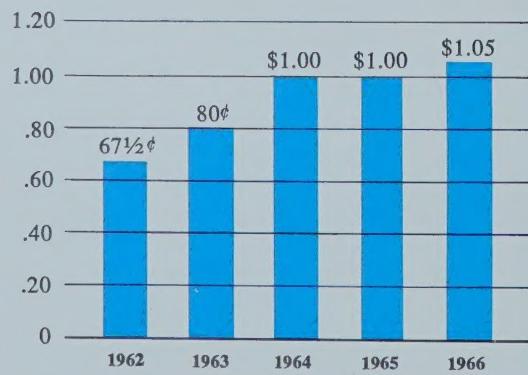
\**Executive Committee*

## *Officers*

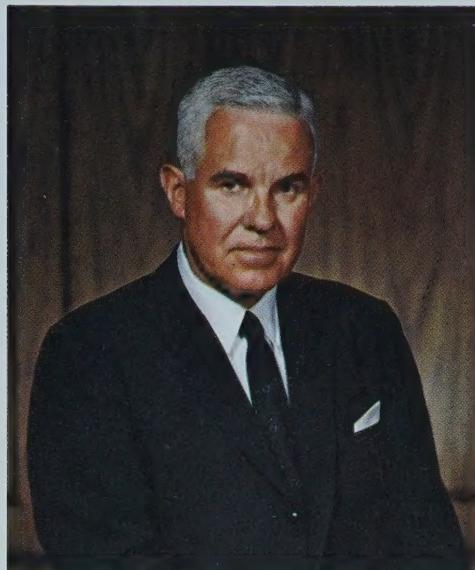
**Kendrick R. Wilson, Jr.**  
*Chairman of the Board  
and Chief Executive Officer*  
**James R. Kerr**  
*President and Chief Operating Officer*  
**Earl H. Blaik**  
*Chairman of the Executive Committee*  
**James R. Dempsey**  
*Group Vice President*  
**Arthur E. Gilman**  
*Vice President*  
**Arthur Kantrowitz**  
*Vice President*  
**E. Douglas Kenna**  
*Vice President, Marketing and Planning*  
**Matthew A. McLaughlin**  
*Vice President and General Counsel*  
**John M. Mihalic**  
*Group Vice President*  
**James E. Mitchell**  
*Vice President, Industrial Relations*  
**John T. Murphy**  
*Vice President*  
**Henry J. Oechler**  
*Vice President, International Operations*  
**Arthur E. Rasmussen**  
*Financial Vice President*  
**Curry W. Stoup**  
*Group Vice President*  
**Beverly H. Warren**  
*Vice President*  
**Louis R. Zimov**  
*Vice President*  
**Frank S. Larson**  
*Treasurer*  
**Gordon M. Tuttle**  
*Secretary*

	<i>Year ended November 30</i>	<i>Year ended November 30</i>
	1966	1965
Net sales .....	<b>\$604,219,545</b>	\$443,194,878
Earnings before income taxes .....	<b>\$57,013,631</b>	\$44,333,287
Net earnings .....	<b>\$32,013,631</b>	\$24,433,287
Net earnings per common share .....	<b>\$2.30</b>	\$1.78
Working capital .....	<b>\$164,682,873</b>	\$133,640,982
Cash dividends per common share .....	<b>\$1.05</b>	\$1.00
Number of holders of common stock.....	<b>95,101</b>	86,830

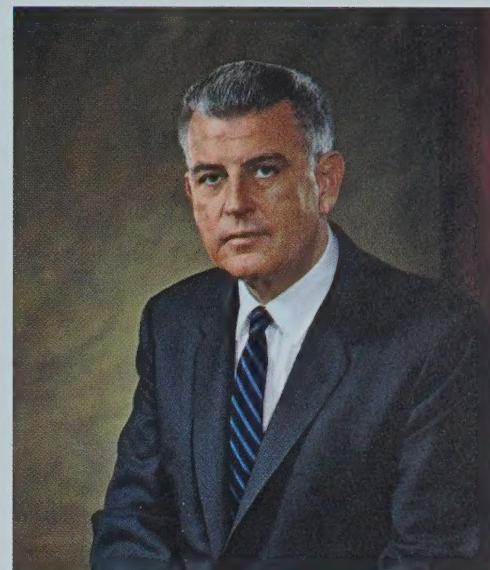
**NET SALES** — IN MILLIONS OF DOLLARS

**NET EARNINGS** — IN MILLIONS OF DOLLARS

**CASH DIVIDENDS PAID** — PER COMMON SHARE

**WORKING CAPITAL** — IN MILLIONS OF DOLLARS


# *Report of the Chairman and President*



KENDRICK R. WILSON, Jr., Chairman



JAMES R. KERR, President

## *To the Stockholders of Avco Corporation:*

We are pleased to report that 1966 was the best year in Avco history. Both our commercial and government businesses achieved record sales and earnings.

For the fiscal year ended November 30, 1966, consolidated net earnings were \$32,013,631, an increase of 31 per cent over 1965 earnings of \$24,433,287. Earnings per common share in 1966 were \$2.30 compared to \$1.78 a year earlier.

Consolidated net sales amounted to \$604,219,545 in 1966, 36 per cent above 1965 sales of \$443,194,878. Operations of Avco Delta Corporation and its subsidiaries are not included in these net sales figures. However, Avco's equity in the consolidated net earnings of Avco Delta is included in Avco's net earnings.

In September, Avco's directors voted to increase the quarterly dividend on the company's common stock to 30 cents per share from the prior rate of 25 cents. This increase was the fourth since 1961 and the latest quarterly dividend payment was double that of five years ago.

The record sales and earnings in 1966 and the favorable results anticipated in 1967 stem directly from important policy decisions made by the company early in this decade, and from the successful implementation of plans formulated at that time.

One of these policy decisions was to increase substantially Avco's research and development expenditures. For example, the company undertook a stepped-up engineering program to develop new reciprocating engines for utility aircraft and to improve the operating efficiency of existing models. This

*1966 Sales  
and Earnings  
Set New  
Records*

*Dividends  
Rise*

*Results  
Reflect  
Previous  
Policy  
Decisions*

*Earnings  
Increased  
by Selective  
Acquisitions  
and Internal  
Growth*

*Commercial  
Operations  
Produce  
64 Per Cent  
of Profits*

action was taken despite opinion in some circles that the future for reciprocating engines might be a limited one. The soundness of Avco's investment was confirmed both by a 135 per cent increase in the sales of Avco Lycoming reciprocating engines over the past five years, and by the outlook for further increases in sales of the engines for many years to come.

Another important policy decision was to increase the proportion of Avco earnings from commercial markets, in contrast to government markets, through a dual program of selective acquisitions and internal growth.

In the past several years, significant progress has been made on the acquisition front. In 1963 we purchased the line of agricultural equipment which was subsequently developed into the Avco New Idea Uni-System. In 1965, Delta Acceptance Corporation, Iowa Finance Company and Bay State Abrasive Products Company were acquired. In the same year Avco Broadcasting Corporation expanded its operations by the acquisition of VHF television station WOAI-TV and clear channel radio station WOAI in San Antonio, Texas, and radio station WWDC and its associated FM outlet in Washington, D.C. In 1966, broadcasting operations were further expanded by the purchase of radio stations KYA (AM) and KOIT (FM) in San Francisco, California. Among Avco Delta Corporation acquisitions was a California group of thrift plan offices.

To meet the increased demands of our customers—both commercial and government—substantially higher capital expenditures for plant and equipment were incurred in 1966. The Coldwater, Ohio, plant of Avco New Idea was enlarged by approximately one third through the addition of 292,000 square feet. A new 400,000 square foot gas turbine engine plant was built by Avco Lycoming at Charleston, South Carolina. An expansion program of 140,000 square feet was partly completed by Avco Bay State Abrasives at Westboro, Massachusetts. Avco Aerostructures Division completed construction of an additional 108,000 square feet of facilities at Nashville, Tennessee.

Further major expansion programs are scheduled for the production of farm equipment, bonded abrasives, reciprocating engines and other products.

Avco's commercial operations have been producing a progressively higher proportion of the company's total profits. In 1966, despite a sharp increase in defense business, profits from commercial sources rose to 64 per cent of total earnings from 56 per cent in 1965 and 47 per cent in 1964. Commercial operations accounted for only 40 per cent of profits in 1963.

Avco holds a strong competitive position in each of its principal fields of activity, and in the past year further improved its position in several areas.

The success of Avco New Idea's self-propelled Uni-System harvesting equipment was a principal reason why the division's sales in 1966 rose 30 per cent from the previous year. Avco's decision in 1963 to invest heavily in the new system was especially opportune as the trend to larger, more mechanized farms continues and the need for food and fiber grows.

Additionally, 1966 sales of our reciprocating engines for executive and utility aircraft were at record levels for the fifth successive year. We expect a further increase in sales in 1967.

*Defense and  
Space Backlog  
Is Higher*

*Research  
Efforts Provide  
Base for  
Future*

Avco Bay State Abrasives is the third largest producer of bonded abrasives and has been steadily increasing its share of the market. With its expanded facilities, the division is in a strong position to continue its growth.

Avco Broadcasting had another record year. Its five VHF television stations, plus four AM and two FM radio stations, make it one of the nation's principal broadcasting groups. Revenue and profit gains are anticipated in 1967.

The contribution of Avco Delta Corporation and its subsidiaries to Avco Corporation's net earnings increased 38 per cent to \$4.9 million from \$3.6 million in 1965, despite the tight money market.

Avco's backlog of government orders rose 88 per cent to more than \$700 million at the end of the fiscal year from \$373 million a year earlier. The principal increases in 1966 government sales were in aircraft engines, airframe components and ordnance. Avco Lycoming gas turbine engines power the great majority of military helicopters. Expanded use of helicopters is anticipated as a means of improving the efficiency and mobility of our armed forces.

Substantial contracts have been awarded to Avco for major airframe components including structures for the C-141 and the giant C-5A heavy logistics aircraft. Avco has been selected to produce the center wing section for the supersonic transport (SST). In the missile field the company received a large contract for the Mark 17 reentry vehicle for advanced ICBMs. The company's space program moved forward with the first suborbital tests of the Avco-produced thermal protection system for the Apollo moon craft. Further tests are scheduled for 1967.

As in the past, the company in large part relies for future growth on the strength of its research and development operations. Areas of future potential include industrial turbine engines, magnetohydrodynamic power generation, infrared devices, lasers and a project involving production of boron fibers which could have wide application in aircraft and spacecraft.

The outlook for your company is favorable. We anticipate continued growth of our principal current products and services, and we expect to derive new products and new businesses from our extensive research and engineering.

On behalf of the Board of Directors, we extend thanks to you, the stockholders of Avco, for your support.

By order of the Board of Directors

*Kendrick R Wilson Jr*

Chairman

*Jama R Ken*

President

January 23, 1967



## Products and Services



### AEROSTRUCTURES DIVISION

NASHVILLE, TENNESSEE

Structures and assemblies for aircraft and helicopters, space vehicles, rocket boosters, missiles—aluminum and stainless steel honeycomb panels, thermal control panels—thrust termination tubes for rockets—metal office furniture manufactured under contract.



WESTBORO, MASSACHUSETTS; TORRANCE, CALIFORNIA;  
BRANTFORD, ONTARIO, CANADA; STEINSEL, LUXEMBOURG

Vitrified and resin bonded grinding wheels and segments—honing stones—abrasive cut-off blades—diamond grinding wheels and cut-off blades—open-mesh coated abrasive cloth.



CINCINNATI, OHIO; HUNTSVILLE, ALABAMA; TULSA, OKLAHOMA

Tactical communications systems—space electronics equipment and systems—infrared systems—field engineering services—commercial electronic products—specialized instrumentation.



EVERETT AND HAVERHILL, MASSACHUSETTS

Reentry physics—plasma dynamics—magnetohydrodynamic (MHD) power generators for commercial and military applications—superconductive devices—space science and technology—biomedical engineering and cardiac assist device research—high power gas laser research and technology.



STRATFORD, CONNECTICUT; CHARLESTON, SOUTH CAROLINA

Gas turbine engines for fixed wing aircraft, helicopters and ground vehicles—marine and industrial engines—engine components—missile reentry vehicles and structural components—rocket motor cases—fuel and oxidizer tanks—ground support equipment for missiles—constant speed transmissions—precision sheet metal fabrication—aircraft mechanical controls.



WILLIAMSPORT, PENNSYLVANIA

Reciprocating engines for fixed wing aircraft and helicopters—engine components—heat treating and plating—hardened and ground precision parts—landing gears—Avco Spencer heating boilers and sewage treatment equipment.



WILMINGTON, MASSACHUSETTS

Ballistic missile reentry systems—maneuvering reentry vehicle systems—penetration aids for strategic and tactical weapons systems—flight testing—arming and fuzing systems—telemetry and instrumentation—environmental testing—supporting and exploratory research.



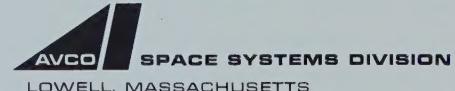
COLDWATER, OHIO; FORT DODGE, IOWA

Avco New Idea Uni-System line of self-propelled corn pickers, shellers, combines and forage harvesters—corn pickers, snappers, picker-shellers, picker-grinders—manure spreaders—fertilizer spreaders—farm wagons—farm elevators—hydraulic loaders and attachments—rotary cutters, mowers, hay conditioners, cut/ditioners, parallel bar rakes, wheel rakes—Avco New Idea Barn-O-Matic barn cleaners, silo unloaders, bunk feeders—Avco Ezee Flow fertilizer spreaders.



RICHMOND, INDIANA

Special nonnuclear ammunition and ordnance—antimateriel and antipersonnel weapons—missile and rocket arming and fuzing—missile, mine, mortar and artillery warheads—air launch weapons—special weapons for limited warfare—Avroc ammunition and other tactical weapons systems.



LOWELL, MASSACHUSETTS

Unmanned planetary exploration systems—scientific satellites—heat protection subsystems—electric propulsion subsystems—guidance, control and communications subsystems—supporting research and environmental sciences.

## *Principal Subsidiaries*



CINCINNATI, OHIO

Radio stations—WLW: Cincinnati, Ohio • WOAI: San Antonio, Texas • WWDC-AM and FM, Washington, D.C. • KYA and KOIT-FM, San Francisco, California.

VHF television stations—WLW-T: Cincinnati, Ohio • WLW-C: Columbus, Ohio • WLW-D: Dayton, Ohio • WLW-I: Indianapolis, Indiana • WOAI-TV: San Antonio, Texas.

Subsidiary—Broadcast Communications Group, Inc.: New York, New York.



NEW YORK, NEW YORK; VARIOUS LOCATIONS IN THE  
UNITED STATES AND CANADA

Personal loans—commercial and industrial financing—industrial banking—  
home improvement financing—farm equipment financing—insurance.

### ECONOMIC SYSTEMS CORPORATION

WASHINGTON, D.C.; POLAND SPRING, MAINE

Educational training services—water resources management—systems analysis  
for economic development.

### MOFFATS LIMITED

WESTON AND ORILLIA, ONTARIO, CANADA; LONDON, ENGLAND;  
UDDINGSTON, SCOTLAND

Gas and electric free-standing, cabinet and built-in ranges—refrigerators—  
clothes washers and dryers—heating equipment—commercial cooking and  
food service equipment—water heaters—range heating elements.

### MEREDITH-AVCO, INC. (50 per cent owned)

CINCINNATI, OHIO

Community antenna television systems.

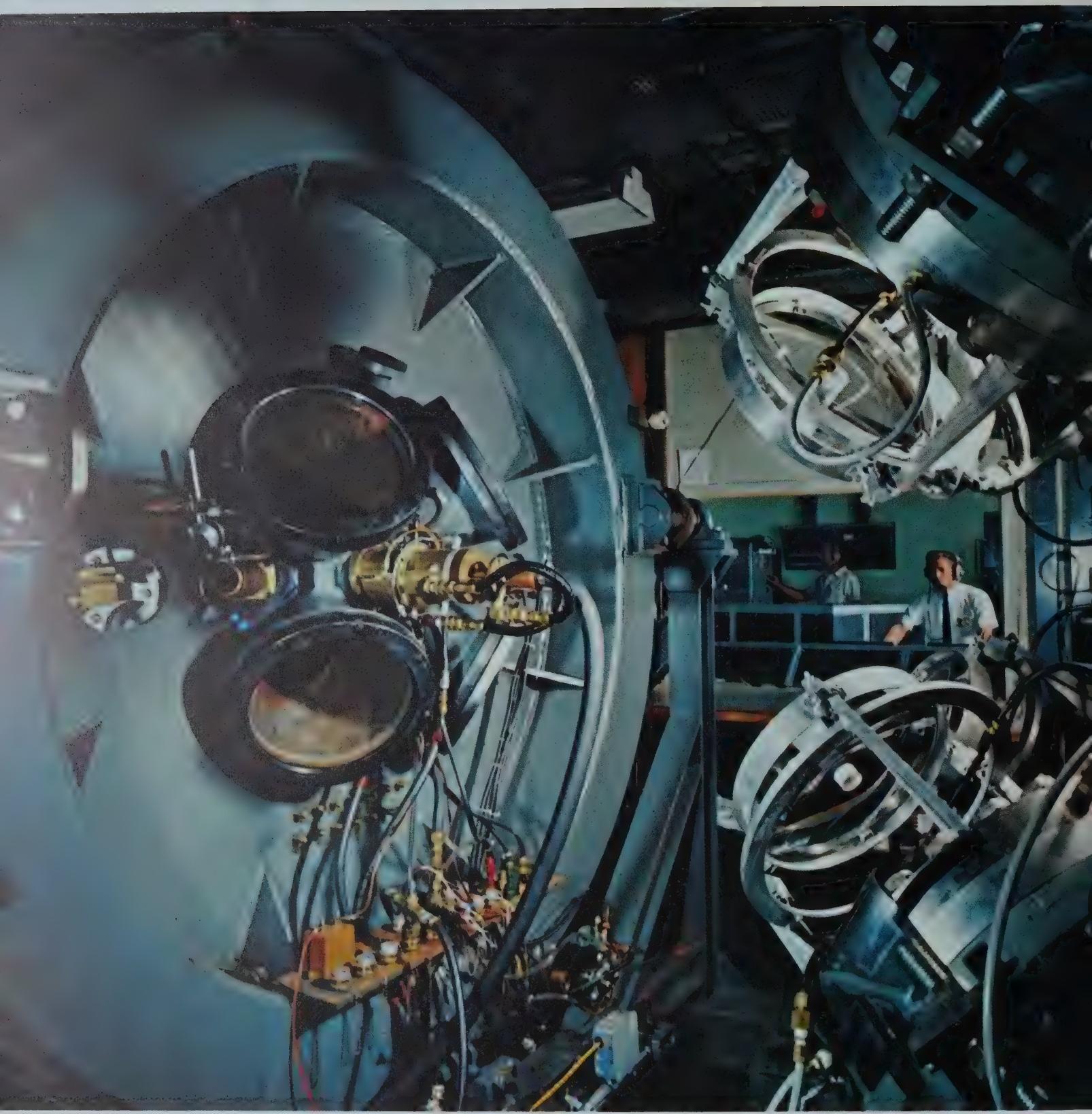


WASHINGTON, D.C.; HOUSTON AND SAN ANTONIO, TEXAS;  
DAYTON, OHIO; LOS ANGELES AND SAN BERNARDINO, CALIFORNIA



NEW YORK, NEW YORK; WASHINGTON, D.C.; PARIS, FRANCE





Avco's expanding research facilities now include this radiation orbital vehicle reentry simulation chamber at Wilmington. The Avco-designed chamber is used to test materials for use on spacecraft and missile systems. Within this specially constructed pressure tank, company scientists and technicians duplicate temperatures reached by space vehicles when reentering the earth's atmosphere at altitudes up to 150,000 feet, and when entering the atmosphere of any other planet within our solar system.



Important areas of work at the Avco Everett Research Laboratory are depicted here. A superconducting energy storage device (*top*) is being wound. A pulsed nitrogen laser (*center*) casts its beam on a screen. The technician (*bottom*) builds an auxiliary left ventricle for the heart.

## *Research and Development*

A major part of Avco products and services providing today's profits evolved from management decisions in the past to invest substantial funds in research. Similar investments are now being made for the future.

Avco's research projects are carried out under important government-funded contracts and company financed programs.

Avco is continuing major research in missile, antimissile and space systems, small scientific satellites, reentry vehicles, gas turbine engines, advanced radar, lasers, communications, plasma physics, magnetohydrodynamics, ferrofluids, infrared systems, cardiac assist devices, biosciences, advanced structural concepts, new power sources and medical engineering.

### **Materials technology research**

The company is carrying on research and applications development in many phases of materials technology. Among the most important is the development of a method for producing boron fibers in volume. Composites using these fibers are expected to have wide application in the manufacture of lighter, stronger aerospace and aircraft structures. A boron fiber pilot plant went into operation at the Space Systems Division in 1966.

This division also is developing a process for three-dimensional weaving of plastic-composite materials having unique thermal and structural potential for space and industrial uses.

### **Building scientific satellites**

Another area of concentration is the development and construction of small scientific satellites for universities and research organizations.

Avco Space Systems Division has received a contract from Kitt-Peak National Observatory, which is operated by the Association of Universities for Research in Astronomy, to design and study the feasibility of an orbiting astronomical explorer satellite. The vehicle is intended to perform experiments to determine atmospheric conditions of Mercury, Mars, Venus, Jupiter and Saturn. In addition, the division is designing and will build for Harvard University a vehicle carrying instruments developed by Harvard to learn more about the physics of the sun. During the year Avco completed an analysis for NASA of two pos-

## *Research and Development*

sible manned explorations of Mars: a 6-man, 21-day project, and a 46-man, 300-day venture.

Avco engineers based at the Jet Propulsion Laboratories in Pasadena, Calif., are devising sterilization procedures which will be incorporated into a facility capable of sterilizing scientific spacecraft. Under a second contract, tests will be conducted to measure contamination of spacecraft components.

Last fall an Avco-developed Resistojet propulsion unit, a low thrust electrically propelled space engine, was flown as an experiment aboard the NASA-launched Applications Technology Satellite, now in orbit. It is one of the lightest flight-qualified spacecraft engines.

### **Contracts for penetration aids**

During 1966 the Missile Systems Division received Air Force contracts for the development of devices which would increase the ability of an ICBM to penetrate enemy defenses. The division also is working on subsystems for short range air-to-surface missiles and mid-range surface-to-surface missiles.

Avco Electronics Division is conducting research in its major product areas: infrared systems, tactical communications and space electronics.

In infrared detection and discrimination techniques, Avco Electronics has contracts to provide advanced airborne

equipment for the Air Force. The division conducts research in electronic tuning, frequency synthesization, and combination high power amplification and antenna matching devices.

Other areas of promise include micro-electronic and integrated circuits for satellite command systems. Research on space environment and mass spectrometric analysis is conducted at the division's Tulsa operation.

### **Airborne monitoring teams**

The Avco Everett Research Laboratory operates airborne monitoring teams over the Pacific to gather data on incoming missiles. After being analyzed at the Laboratory, this data is used in designing advanced reentry vehicles for the Air Force and in work conducted under the Army's Nike X antimissile program.

Avco has long been a leader in the development of magnetohydrodynamic generators and superconducting magnets and devices. During 1966 Avco Everett completed and tested what is believed to be the free world's largest superconducting magnet. The development of this device eliminates one of the last major obstacles to building a commercial MHD power generator on a pilot basis. Avco and 13 major power companies, represented by the American Electric Power Service Corporation, are studying the possibility of building such a generator.

Underway for NASA is a program to develop a superconducting magnet system for an Apache sounding rocket. Contracts were received during the year from the Navy to study superconducting electric motors for marine propulsion, and from the Army to study superconducting windings in high power electric aircraft motors.

The National Institutes of Health awarded Avco Everett a contract to produce 50 heart assist devices, known as auxiliary left ventricles, for evaluation by the medical community under the direction of the National Heart Institute. Two such devices, which take over about half of the heart's work load, were implanted in two patients at Maimonides Hospital, Brooklyn, during the year. The Labora-

tory also has contracts with the Air Force Office of Scientific Research and the Office of Naval Research to study fluid dynamics of blood with special attention to its effects on clotting.

Research programs concerned with the production of huge aircraft sections are being carried on at Avco Aerostructures Division. As the industry moves further into the supersonic era, Avco is taking steps to perfect advanced structural concepts, including brazing and forming of various materials.

Avco accelerated research and development in ordnance for limited and peripheral warfare. Several divisions are involved in studies of advanced weapons, detection systems, personnel armor and other materiel.

A major emphasis of Avco Lycoming's research at Stratford was on the AGT-1500, a gas turbine engine being developed under Army contract for tanks and other vehicles. This project calls for the development of a turbine that will weigh half as much as a diesel engine of comparable power, and which will, for the first time, equal or exceed the efficiencies, including specific fuel consumption, of the comparable diesel.

### **More powerful engines**

The division continued its program of increasing the power output of its basic aircraft turbines. The T53 model is slated to reach 1800 shaft horsepower, while the T55 version will be uprated to 3800 shaft horsepower.

A promising area of research going forward at the Space Systems Division is in the field of ferrofluids—highly magnetic fluids. Ferrofluids may some day be put to such uses as stabilizing devices for orbiting spacecraft.

Avco is also working on the conversion of coal to gas and liquid products. Avco Space Systems has obtained a contract from the Department of Interior's Office of Coal Research to study the commercial feasibility of coal conversion. The contract provides that if the studies warrant, a pilot plant capable of processing 10 tons of coal a day will be constructed.



Avco's commitment in space ranges from small scientific satellites to the manned Apollo program. Spacecraft models shown here include those proposed for planetary mapping, radio astronomy, recovery of data, atmospheric measurements and manned space flight.



Among the most important areas of Avco's research is the development and use of new materials. By designing a three-dimensional loom (above) Avco scientists have made it possible to tailor a number of different kinds of materials into composites designed for specific applications. With 3-D weaving, materials such as boron can be interlaced in three directions to achieve greater strength and stiffness in composites which have low weight, high strength characteristics. The new process has applications in construction of space vehicles as well as deep-submergence hulls.



The entire Avco New Idea product line is seen on parade immediately above. In the foreground are haytools. In succeeding rows are chemical fertilizer spreaders, farmstead automation equipment, manure spreaders, corn pickers and the Uni-System line of interchangeable, self-propelled harvesting equipment. The division expanded the Uni line, adding several harvesting implements and two power units.



Boeing has selected Avco Aerostructures to build the immovable center wing section of its supersonic transport (SST). The 40-foot center sections will be made of a special titanium-based alloy.

## Commercial Products and Services

Avco continued to expand its commercial business. Record sales were achieved in farm equipment, reciprocating engines, abrasives and broadcasting operations.

### Manufacturing

In the three principal categories where Avco has chosen to concentrate its major commercial manufacturing activity—specialized farm equipment, reciprocating engines and industrial abrasives—1966 was a record year for the company. The demand for these products seems likely to continue strong in the years ahead.

Paced by the Uni-System line of interchangeable self-propelled harvesting equipment, sales volume of most product lines bearing the Avco New Idea farm equipment trademark increased in 1966. The rapidly growing popularity of Uni-System continued to play a major role in the division's growth. A high capacity forage harvester, two new power units and other new harvesting units were added to the Uni-System line. Avco New Idea also introduced two new haytools.

The division increased its shipments of manure spreaders and corn harvesting equipment. Sales of Avco New Idea Barn-O-Matic farmstead mechanization equipment rose; Avco Ezee Flow gave

marketing emphasis to its large spinner-type chemical fertilizer spreader.

Demand for Avco New Idea products made it necessary to add manufacturing, storage and office space. A new 292,000 square foot warehouse and office building was dedicated in August. This increased total floor space at the Coldwater plant by 30 per cent. The expansion effort has been further extended with a new \$3.8 million building and equipment program.

### Foreign markets

Avco New Idea products continued to gain acceptance in foreign markets. Uni-System power units with various harvesting attachments were tested in France and Yugoslavia.

Sales of Avco New Idea Division were the best in history as volume increased 30 per cent above 1965, the previous record year. Inasmuch as world-wide demand for food is reducing the U.S. surplus, it is expected that the demand for modern, more efficient farm equipment will continue.



The growing fleet of executive and utility aircraft provides Avco Lycoming with an expanding market for its reciprocating engines. Executive models powered by Avco engines include the Beech Queen Air (*left*), the Piper Twin Comanche (*center*) and the Aero Commander 500B. Three established engine families are produced at Williamsport: geared (*left*), direct drive (*center*) and helicopter. In the foreground is the TIO-541, the first model of a new engine family, featuring equipment for cabin pressurization and air conditioning; two subsequent members of the same family have now received FAA certification.



A Piper landing gear (top) is manufactured under contract at the Williamsport plant. Avco Bay State abrasive products (center) are made in a variety of sizes, shapes and colors. Fired by intense heat, vitrified wheels (bottom) used in precision grinding are a mainstay of the division.

While Avco's farm equipment sales were achieving new highs, records were being set in another expanding market.

Demand for Avco Lycoming reciprocating engines was greater than ever for use in short haul executive aircraft, commuter airlines, air taxi services and private flying. A recent study released by the Federal Aviation Agency forecast that the need for reciprocating aircraft engines will rise substantially in the next decade.

For many years, Avco Lycoming reciprocating engines have been chosen to power more types of aircraft than those of any other manufacturer. During 1966 the company introduced several new and improved fixed wing and helicopter engines.

#### Advanced engines developed

At the Williamsport plant, Avco Lycoming is now developing new models of engines equipped with turbocharging and other features that permit operation at altitudes above the "weather" with cabin pressurization. The addition of these features should extend the life and use of reciprocating engines by the general aviation fleet for many years.

Subcontracting work at Williamsport also increased considerably during the year. In addition to the production of major rotor components for the Boeing CH-46 Sea Knight Marine helicopter, the facility began to make landing gears for Piper Aircraft Corporation.

Concurrently, Avco Lycoming at Stratford has provided gas turbine engines for commercial helicopter use, though this production has been limited due to military priorities. A new plant at Charleston, S.C., will supplement the Stratford plant and make increased commercial output possible, including engines for industrial and marine use.

Helicopters powered by T53 turbines are being used in 21 countries. The division established several new distributors to handle sales in Europe, Japan, Indonesia and parts of South America. It also has licensed overhaul facilities in Australia, Italy, Japan and Canada.

Avco Lycoming has introduced a com-

bined diesel and gas turbine system for both commercial and military craft. The advantage of such a system is that it provides economical diesel power for long, low speed runs combined with the high speed, high power capabilities of the turbine as needed.

Avco Bay State Abrasives Division again had record sales. Most of the division's products are used in the metalworking industries. Major customers are producers of transportation equipment, machinery and primary metals, or are fabricators of metal products. The year 1966 was one of growth for these industries, and Avco Bay State shared in their record production.

New copper-base diamond grinding wheels, marketed in volume during the last quarter of 1965, accounted for a substantial part of the 30 per cent increase in diamond wheel sales in 1966.

The division developed special purpose coatings which are applied to metal subsurfaces under high temperature. It also introduced a process for applying a tungsten carbide edge to electric knife blades, and began a pilot operation designed to apply functional coatings to the edges of razor blades.

#### Research center

The division will soon occupy its new 43,220 square foot Research and Engineering Center. An expansion program, including provisions for doubling production capacity for diamond resin bonded grinding wheels, also is going forward.

Bay State Abrasives, S.A., Luxembourg, which began operations in 1964, is producing a full line of bonded abrasive products which are marketed in Great Britain and on the Continent.

Other Avco commercial manufacturing operations made progress. In Nashville, the Avco Aerostructures Division increased its production of wings for the speedy, long-range Grumman Gulfstream II executive jet transport. Boeing, chosen to build the first United States supersonic jet transport (SST), has selected the Aerostructures Division to produce the center wing for this new aircraft. This will take the division into

## Commercial Products and Services



new technology, and gives promise of a large production run extending over many years.

Production of office furniture under contract to another manufacturer proceeded at Avco Aerostructures. This work will continue in 1967.

Avco's Canadian appliance subsidiary,

Moffats Limited, materially improved its sales in 1966. It introduced new and improved home appliances—ranges, refrigerators, washers and dryers—and marketed a new industrial heater. Moffats is a leading Canadian manufacturer of commercial food service equipment for hospitals and restaurants.

### Economic Systems Corporation

This subsidiary was organized in 1966 to participate in important new education, health and economic programs undertaken by both the government and private enterprise.

Its first major activity is the operation of the country's largest women's Job Corps training center at Poland Spring, Maine. This program is conducted under a contract with the Office of Economic Opportunity.

At the end of the year the authorized complement of 1,080 young women,

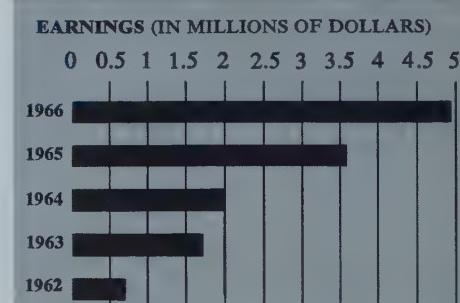
ranging in age from 16 to 21, was in residence at the center. The residents receive extensive vocational training to prepare them to fill secretarial and clerical jobs as well as positions in veterinary medicine.

Economic Systems Corporation also is seeking contracts in water resources conservation. To that end, it is applying systems analysis to the assessment of the country's future water requirements and the development of plans to meet those future needs.

Veterinary skills (*top photo*) are among the vocations taught at Avco's Job Corps training center; this unit is the largest one for women. Ranges in modern colors (*lower photo*) are an important part of the Moffats product line.

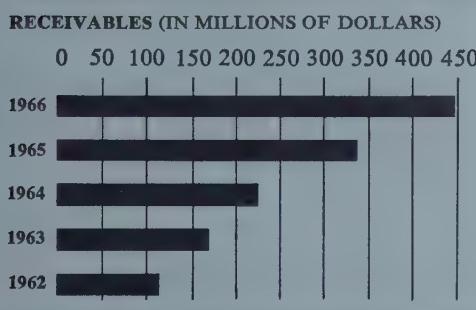


### FINANCIAL SERVICE OPERATIONS





### Financial Services



Avco Delta Corporation and its subsidiaries offer a broad spectrum of financial services, including consumer loans, retail installment financing, capital equipment loans and insurance coverage.

Avco Delta's 1966 net earnings rose more than one third over 1965 to a record \$4.9 million, accounting for 15 per cent of Avco's 1966 earnings.

The increase in 1966 earnings over those for the prior year resulted from internal expansion and acquisitions, partic-

ularly that of Iowa Finance and its subsidiaries late in 1965.

Receivables increased 33 per cent during the year to \$449 million. Total available bank lines were increased to \$174 million. Long term debt totaling \$80 million was placed during fiscal 1966.

Avco Delta's operations were expanded during 1966. During the year, Avco Delta made several acquisitions, including Morthrift Plan (now Avco Thrift) in California. Through acquisitions and branch

The many uses of Avco Delta Corporation funds are illustrated in the photograph above. Borrowers may finance purchases of cars, boats and capital equipment and cover the costs of vacations, education and home improvements.

## *Commercial Products and Services*

openings, a total of 72 offices were added, bringing the number of offices in Canada and the United States to 426, compared with 354 offices on November 30, 1965. Avco Delta's subsidiaries now operate in 22 states and all 10 Canadian provinces.

Avco Delta continues to place important emphasis on the consumer lending area where loans are made directly to qualified individuals. Financing is also provided for home improvements and purchases of capital equipment, autos and farm equipment, with the latter being

handled through newly-formed Avco New Idea Credit Corporation. Avco Delta's industrial bank and thrift subsidiaries offer savings deposit services and its insurance subsidiaries provide a broad variety of coverages.

To establish a more cohesive corporate identity, the name of Delta Acceptance Corporation Limited, was changed to Avco Delta Corporation Canada Limited. Among other subsidiaries renamed was Iowa Finance Company which became Avco Finance Company.

### *Broadcast Services*

Avco Broadcasting Corporation recorded the highest revenues in its 44-year history. It acquired two new radio stations, KYA and KOIT (FM) in San Francisco and now operates a total of six radio stations (including two 50,000 watt clear channel outlets) as well as five VHF television stations.

Long a leader in color television programming, Avco Broadcasting helped pave the way with more improvements in this field. WLW-T, Cincinnati, became one of the first stations in the country to present complete news programs in color, installing a new high speed film processor that develops color film for broadcasting in 30 minutes. It also has expanded its news programming to include hour long news, sports and weather broadcasts. Reports from WWDC, Avco's outlet in Washington, frequently are an important part of these programs. Similarly, WWDC's large news staff is used for reports of special interest for broadcast by other Avco stations.

By the end of 1967, all Avco Broadcasting television stations will be equipped to originate their own live color shows. Programming on television and radio stations alike gives special emphasis to local news, personalities and public service activities.

"Midwestern Hayride," for 20 years a favorite regional program of country music, was syndicated during the year and now is seen in 45 markets throughout the United States.

Avco Broadcasting's wholly-owned subsidiary, Broadcast Communications Group, a national sales representative firm, opened a new office in Dallas. It now represents stations in New York, Detroit, Philadelphia, Boston and Los Angeles as well as Avco's outlets.

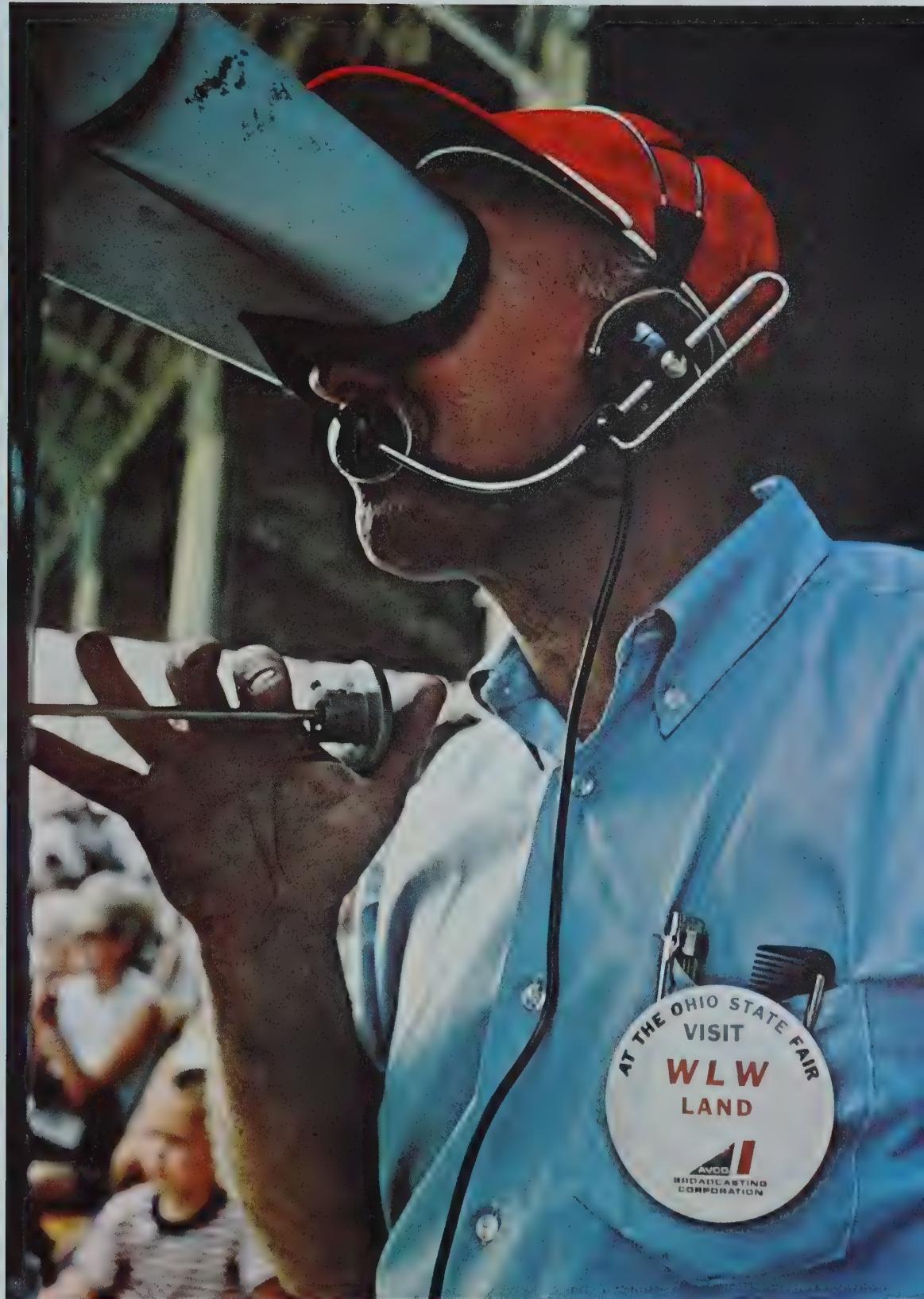
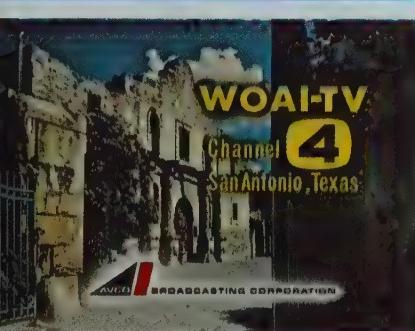
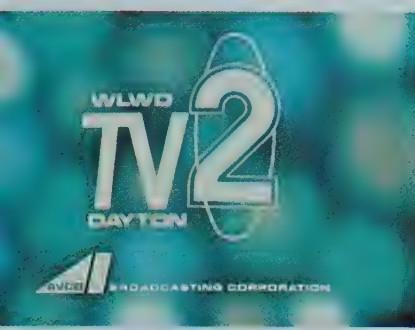
Meredith-Avco, Inc., a community antenna television (CATV) company owned equally by Avco and Meredith Publishing Company, now operates 14 CATV systems in the South and Southeast and has two others ready for construction, pending FCC approval of operating plans. The recent upsurge in color telecasting with the accompanying need for increased picture fidelity has generated additional demand for CATV services.

By mid-1967 it is expected that more than 25,000 subscribers will be receiving Meredith-Avco services.

Meredith-Avco also has a half interest in Florida TV Cable, Inc., which has two systems that are expected to have 15,000 subscribers by mid-1967.



A microphone is encircled by Avco Broadcasting stars (top) during a recording session. A "live" stage show (below) features singers.



Avco Broadcasting originated more than 50 telecasts in color from the Ohio State Fair last year. A cameraman is seen at work during a performance at the main grandstand; many of the shows were staged in a newly built structure called "WLW Land." All the station identifications of Avco's TV outlets (left) include the corporate symbol.



Avco developed and manufactures the Apollo spacecraft thermal protection system. Here the first Apollo craft to be launched is retrieved from the sea after a suborbital mission. In this and another unmanned suborbital flight the heat shields performed to specifications. In an Apollo capsule, U.S. astronauts will set out on a voyage to the moon and back. The heat shield's function is to protect the craft from the intense heat encountered on reentering the earth's atmosphere. Shielding is applied to the craft at Avco Space Systems Division.

## *Defense and Space*

Military production and backlog rose in response to immediate and long term defense requirements. Activities conducted under the space program also increased.

Avco's output of military products, including basic equipment for limited warfare purposes and sophisticated missiles, expanded steadily during the year. Production for the nation's space program remained at a high level.

Avco's backlog of government orders rose to a new record of more than \$700 million at year end. The total compares with \$373 million a year earlier.

The Avco Lycoming line of gas turbine helicopter engines accounts for the largest part of Avco's record order backlog. This accumulation of orders reflects the need for tactical mobility that has been demonstrated in Vietnam, where Avco engines power the vast majority of the helicopters in use. Requirements for these engines are expected to continue after peace is achieved in Southeast Asia as the armed forces re-equip their units for helicopter operations.

Production schedules for gas turbine engines at the Stratford plant were increased several times during the year. Last summer the manufacture of certain engine components and ground support equipment was transferred to a new facility at Charleston, S. C.

Avco Lycoming's T53 is the Army's primary helicopter engine. It powers the Bell UH-1 Huey helicopter, the Grumman OV-1 Mohawk fixed wing observa-

tion plane and the Kaman HH-43 Huskie. The Huey is a mainstay for the military in Vietnam, along with the Boeing CH-47A Chinook, a twin engined transport driven by Avco Lycoming's higher powered T55 engines.

The T53-L-11 was Lycoming's principal production item in 1966; the division is now phasing to the more advanced T53-L-13 model rated at 1400 shaft horsepower. It has been chosen for the Bell UH-1 series and the Army's new armed battle helicopter, the AH-1G HueyCobra. A turboprop version, the T53-L-15, will enter production shortly for Mohawk aircraft. More advanced versions of the T55 engine, rated at 2850 shaft horsepower, have also entered production to replace earlier models.

### **Other aircraft components**

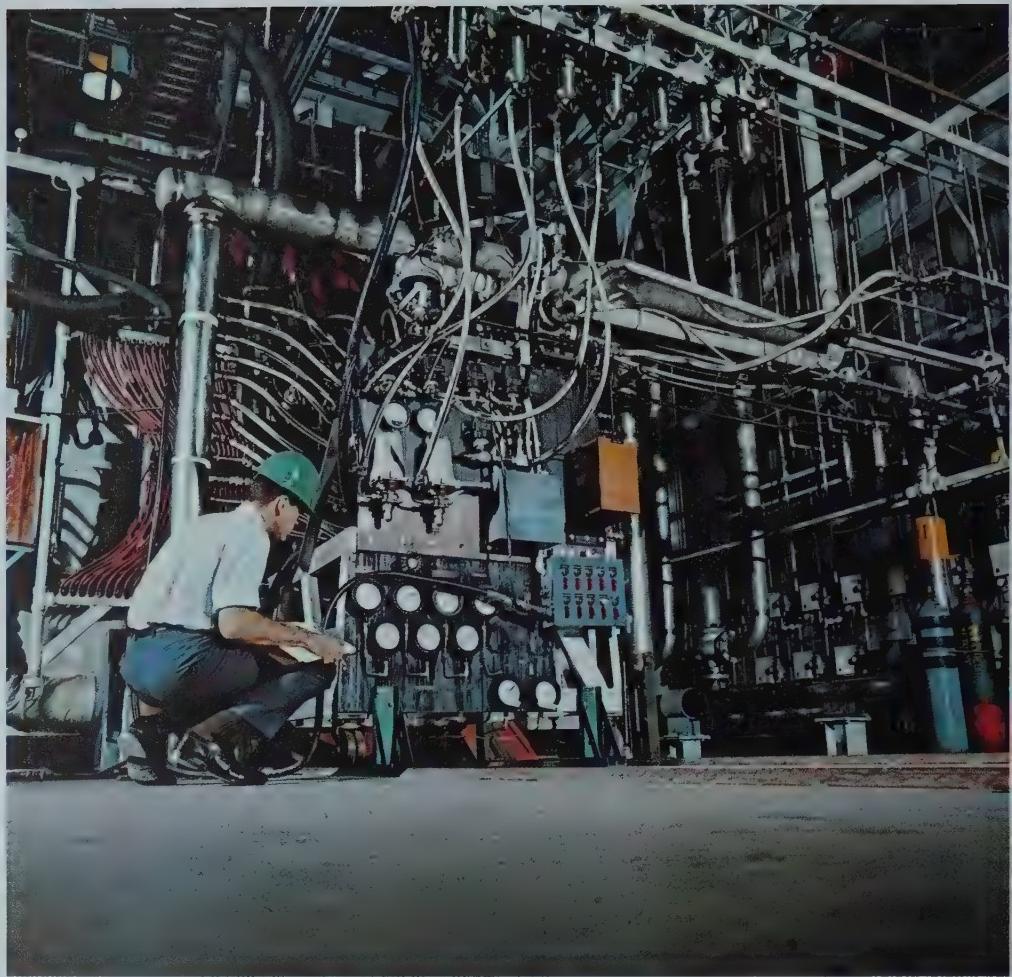
The Stratford plant continued to produce constant speed drives for the electrical system in the Navy's carrier-based Douglas A4E Skyhawk.

Avco Lycoming at Williamsport produces reciprocating engines which power all primary and basic training helicopters used by the Army. Many of the small aircraft flown by all services in Southeast Asia on command, liaison and utility missions have reciprocating engines made at Williamsport. Additionally, a





A 20-megawatt MHD generator (top right) built by Avco Everett is being tested as a power source for a hypersonic wind tunnel at the Air Force's Arnold Engineering Development Center. Avco Aerostructures produces tail booms for Bell UH-1 helicopters (top left) and wing sections for the Lockheed Aircraft C-141 military jet transport (bottom). An Avco Ordnance technician (center) uses custom designed assembly equipment.



400-horsepower 8-cylinder Avco engine is being used by the Army to power an experimental air boat.

The Vietnam conflict required intensified activity at the Avco Ordnance Division, where output attained record levels. The division received orders for 40 millimeter and mortar ammunition, bomb and rocket fuzes, bomb parts, and other nonnuclear ordnance.

Avco Ordnance has developed a line of rocket-boosted ammunition called Avroc, used in the M-79 grenade launcher and M-75 helicopter grenade launcher. The Richmond facility is also producing air-launched munitions, miniaturized proximity fuzes, arming and fusing systems for Minuteman and Polaris, ammunition for a new helicopter weapon system and target markers.

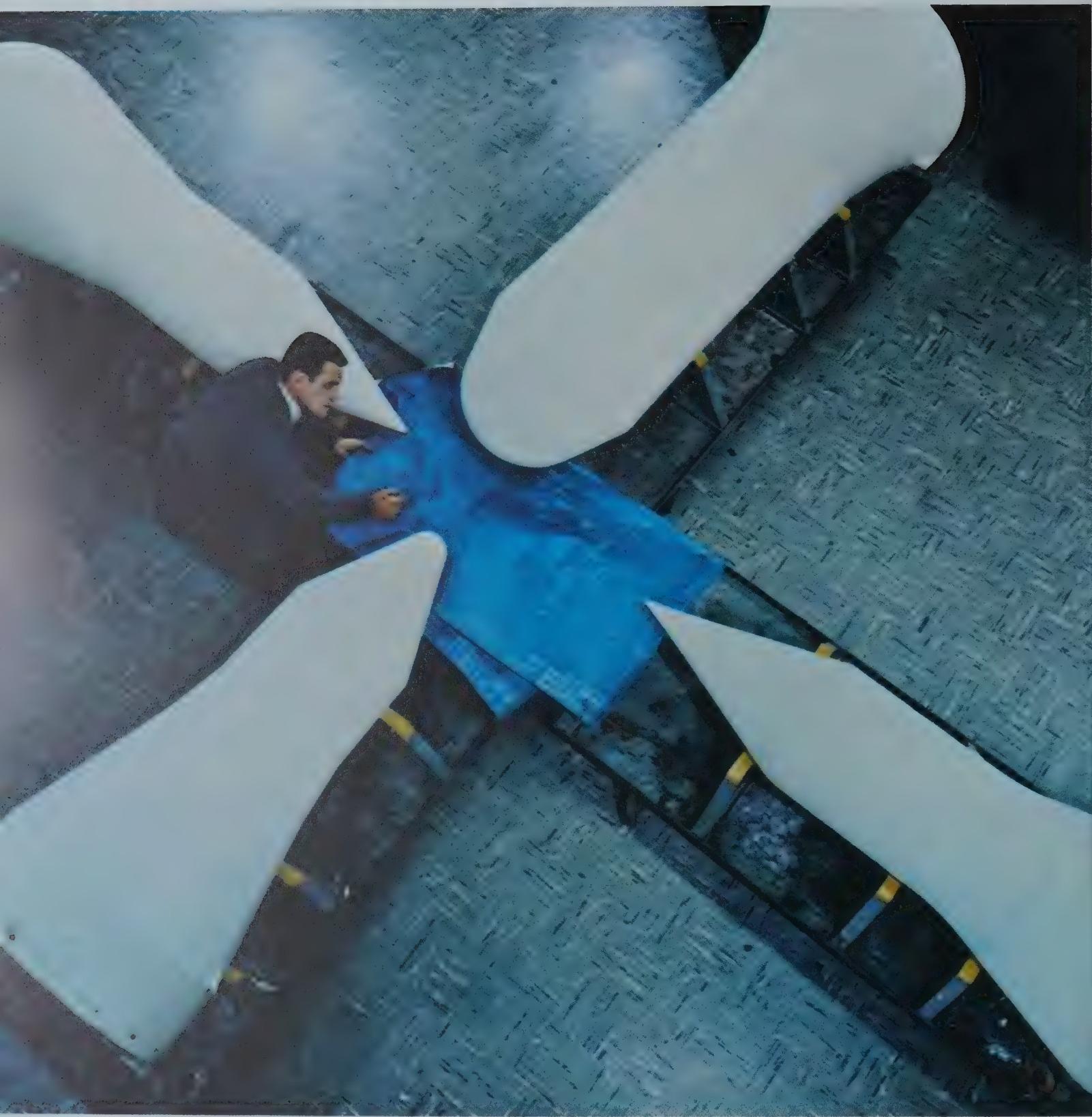
New contracts have been received by Avco Aerostructures Division for center wing plus inner and outer wing panels for Lockheed's C-5A, the world's largest military jet transport. It also is making horizontal and vertical tail assemblies for the Lockheed C-130 Hercules, a program that has been underway for more than 12 years. The plant also fabricates wing box beam assemblies for the Lockheed C-141 Starlifter jet transport.

Increased need for helicopters brought additional production of tail booms and cabin roof assemblies for the UH-1 Huey series at Avco Aerostructures. Structural components for other aircraft also are manufactured at the facility.

Field communications, including ground-to-ground, air-to-ground, and air-to-air, are of vital importance in the



Avco Lycoming gas turbine engines power most of the helicopters used by U.S. forces in Vietnam. The T53 engine is used by the Bell UH-1 Huey (above). Steadily rising demand for Lycoming turbines for military helicopters last year resulted in record production at the division's Stratford plant. During the summer, the manufacture of some ground support equipment and certain engine components was transferred to the newly-opened Charleston facility.



Avco has been a leading producer of reentry vehicles for Air Force intercontinental ballistic missiles for more than a decade. It is today engaged not only in the development and manufacture of operational vehicles but in design of future types carrying increasingly sophisticated equipment. Shown above are four reentry vehicles ranging from the kind mounted on early Titan ICBMs to the more advanced models for Minuteman squadrons.



Vietnam war. Avco Electronics Division's ARC-123 and AT-400 airborne transceivers are in production; the PRC-70 and PT-5 manpack radio sets made for battle use are now on field tests. The AM-4306 amplifier is in production and will be mated with portable combat radio equipment now in standard use by the Army. Assembling of vehicular antennas is being conducted at Avco Electronics' operation in Huntsville.

#### Strategic deterrent assignments

Avco has major assignments in another military category, that of strategic deterrence. The company produces reentry systems for intercontinental ballistic missiles, a field in which Avco pioneered and is preeminent. Manufacture of reentry vehicles at Avco Lycoming in Stratford continued at about the same level as in 1965, centering on the Mark 11A vehicle for the Minuteman II weapon system. The company's Missile Systems Division is developing a more advanced Minuteman reentry system designated Mark 17. Production on this multimillion dollar project will be eventually centered at Avco Lycoming in Connecticut. The corporation has been associated with the Air Force in missile work for more than 10 years.

The Apollo space program, which has as its goal a manned landing on the moon, was highlighted in 1966 with suborbital flights in February and August. The vehicles were "rammed" back into the

earth's atmosphere at great speeds in successful tests of Avco-built heat shields. In both unmanned tests, the shields made at Avco Space Systems met all their mission requirements. Further tests are scheduled for the current year.

This division is proceeding with work on 13 additional spacecraft scheduled for follow-on missions near the moon, and reentry from actual lunar flights. In a related project for the NASA Pacemaker program, the division designed and built a flight test model covered with Apollo ablative material. This vehicle has been successfully flown and recovered.

#### Space model contracts

Because of the highly specialized manufacturing techniques developed for the Apollo program, Avco Space Systems was awarded two additional long term contracts. One calls for the production of full-scale mock-ups, including both the Apollo service module and lunar excursion vehicle; the other covers a variety of spacecraft models for wind tunnel and ballistic range testing.

In another aspect of the space program, Avco Aerostructures produced thrust termination tubes for the Titan IIIC rocket and structural parts for the Saturn launch vehicle.

The division has perfected a process for producing fluxless brazed aluminum sandwich structures for thermal conditioning panels aboard rocket boosters and manned spacecraft.



Avco Electronics supplies infrared countermeasures systems and compact, high frequency radios for the F-111 (top). An amplifier made at Evendale attaches to the back of a standard portable combat radio (bottom) and greatly increases its range.



**CORPORATION**

*1966 Financial Review*

**ARTHUR YOUNG & COMPANY**

277 PARK AVENUE  
NEW YORK, N.Y. 10017

The Board of Directors and Stockholders  
Avco Corporation

We have examined the accompanying statement of consolidated financial position of Avco Corporation at November 30, 1966 and the related statements of consolidated earnings and additional paid-in capital for the year then ended. We have also examined the accompanying statement of consolidated financial position of Avco Delta Corporation at November 30, 1966 and the related statement of consolidated earnings for the year then ended. Our examinations were made in accordance with generally accepted auditing standards, and accordingly included such tests of the accounting records and such other auditing procedures as we considered necessary in the circumstances. It was not practicable to confirm amounts due to Avco Corporation from the U.S. government, as to which we satisfied ourselves by means of other auditing procedures.

In our opinion, the statements mentioned above present fairly the consolidated financial position of Avco Corporation at November 30, 1966 and the consolidated results of its operations for the year then ended, and the consolidated financial position of Avco Delta Corporation at November 30, 1966 and the consolidated results of its operations for the year then ended, all in conformity with generally accepted accounting principles applied on a basis consistent with that of the preceding year.

*Arthur Young & Company*

January 17, 1967



## *Consolidated Earnings (Note 1)*

	<i>Year ended November 30 1966</i>	<i>Year ended November 30 1965</i>
Net sales .....	\$604,219,545	\$443,194,878
Equity in consolidated net earnings of		
Avco Delta Corporation (Note 1) .....	4,900,558	3,561,123
Other income .....	673,946	1,904,724
	<u>609,794,049</u>	<u>448,660,725</u>
Costs and expenses		
Cost of sales .....	484,205,480	351,853,234
Selling and administrative (Note 5) .....	52,808,467	42,623,365
Depreciation .....	8,808,323	7,042,338
Interest .....	6,958,148	2,808,501
U.S. federal and Canadian income taxes .....	25,000,000	19,900,000
	<u>577,780,418</u>	<u>424,227,438</u>
<b>NET EARNINGS</b> .....	<b>32,013,631</b>	24,433,287
Cash dividends declared		
\$4.50 preferred stock .....	157,500	39,375
Common stock—\$1.05 per share in 1966 and \$1.00 per share in 1965 .....	14,547,566	13,705,344
	<u>17,308,565</u>	<u>10,688,568</u>
Increase in retained earnings .....	109,406,467	98,717,899
Retained earnings at the beginning of the year ....	<u>126,715,032</u>	<u>\$109,406,467</u>

## *Additional Paid-in Capital*

Balance at the beginning of the year .....	\$ 77,788,614	\$ 32,893,214
Excess of market price over par value of Avco common shares issued in exchange for shares of Avco Delta Corporation Canada Limited (formerly Delta Acceptance Corporation Limited) (1966—66,800 shares; 1965—2,340,456 shares) .....	1,238,415	44,176,107
Excess of proceeds received over par value of common stock issued on exercise of options (1966—56,766 shares; 1965—34,602 shares) ..	1,031,894	432,618
Excess, over par value, of principal amount of 5% convertible subordinated debentures converted into common stock, after adjustment for purchase of fractional shares, etc. (1966—\$1,101,600 converted into 95,674 shares; 1965—\$385,200 converted into 33,407 shares)	820,586	286,675
Balance at the end of the year .....	<u>\$ 80,879,509</u>	<u>\$ 77,788,614</u>

See accompanying notes page 32.



## *Consolidated Financial Position (Note 1)*

	<i>November 30 1966</i>	<i>November 30 1965</i>
<b>ASSETS</b>		
Cash .....	<u>\$ 26,447,479</u>	<u>\$ 20,215,558</u>
Marketable securities, at cost (approximate market) .....	<u>6,840,718</u>	<u>7,111,573</u>
Receivables		
U. S. government .....	<u>62,240,598</u>	42,992,190
Other .....	<u>50,690,618</u>	59,147,873
	<u>112,931,216</u>	<u>102,140,063</u>
Inventories, at the lower of cost or market		
U. S. government contracts and subcontracts .....	<u>110,323,657</u>	65,263,027
Progress payments .....	<u>(39,520,281)</u>	(16,265,336)
Civilian .....	<u>51,505,582</u>	39,554,808
	<u>122,308,958</u>	<u>88,552,499</u>
<b>TOTAL CURRENT ASSETS</b> .....	<u>268,528,371</u>	<u>218,019,693</u>
Property, plant and equipment, at cost		
Land .....	<u>2,999,195</u>	3,067,593
Plant and equipment .....	<u>150,539,657</u>	132,449,858
Accumulated depreciation .....	<u>(77,940,674)</u>	(71,498,448)
	<u>75,598,178</u>	<u>64,019,003</u>
Investment in Avco Delta Corporation, at equity in net assets (Note 1) .....	<u>106,168,861</u>	<u>89,533,534</u>
Other assets		
Miscellaneous investments, at cost .....	<u>9,986,292</u>	8,341,628
Intangible assets recognized in acquisitions of non-finance businesses, being carried without amortization .....	<u>20,226,944</u>	16,158,864
Other intangible assets, at cost less amortization	<u>603,809</u>	776,286
	<u>30,817,045</u>	<u>25,276,778</u>
<b>TOTAL ASSETS</b> .....	<u>\$481,112,455</u>	<u>\$396,849,008</u>

See accompanying notes page 32.

	<i>November 30 1966</i>	<i>November 30 1965</i>
<b>LIABILITIES AND STOCKHOLDERS' EQUITY</b>		
Notes payable (Note 2) .....	\$ —	\$ 10,000,000
Accounts payable and accrued liabilities .....	<b>78,002,812</b>	53,989,407
U.S. federal and Canadian income taxes .....	<b>22,938,236</b>	19,919,733
Long term debt installments due		
within one year .....	<b>2,904,450</b>	469,571
<b>TOTAL CURRENT LIABILITIES</b> .....	<b>103,845,498</b>	84,378,711
Long term debt (Note 2) .....	<b>124,341,140</b>	80,783,000
<b>STOCKHOLDERS' EQUITY</b>		
Preferred stock, without par value		
Authorized: 200,000 voting shares		
Designated and issued: \$4.50 cumulative convertible, stated at liquidating value of \$100 per share—35,000 shares .....	3,500,000	3,500,000
Common stock, par value \$3 per share		
Authorized: 20,000,000 shares		
Issued: 13,961,877 shares in 1966 and 13,742,637 shares in 1965 .....	<b>41,885,631</b>	41,227,911
Reserved in 1966: 564,633 shares (Note 3)		
Additional paid-in capital .....	<b>80,879,509</b>	77,788,614
Retained earnings (Note 4) .....	<b>126,715,032</b>	109,406,467
	<b>252,980,172</b>	231,922,992
Cost of common stock held in treasury: 1,900 shares in 1966 and 9,900 in 1965 .....	<b>(54,355)</b>	(235,695)
<b>TOTAL STOCKHOLDERS' EQUITY</b> .....	<b>252,925,817</b>	231,687,297
<b>TOTAL LIABILITIES AND STOCKHOLDERS' EQUITY</b> .....		
	<b>\$481,112,455</b>	\$396,849,008

See accompanying notes page 32.



## Notes to Consolidated Financial Statements

### NOTE 1: AVCO DELTA CORPORATION

The consolidated financial statements of Avco Corporation include the accounts of all wholly-owned subsidiaries other than finance subsidiaries (operated through Avco Delta Corporation). The consolidated financial statements of Avco Delta Corporation are shown separately. Avco's investment in Avco Delta is stated at Avco's equity in the consolidated net assets of Avco Delta which include \$55,307,251 of cost in excess of Avco Delta's acquired equity in net assets, which excess is being carried without amortization.

At November 30, 1966, Avco was contingently liable with respect to approximately \$21,200,000 of receivables from commercial customers sold to Avco Delta.

### NOTE 2: LONG TERM DEBT

At November 30, 1966, long term debt consisted of:

Notes payable to banks issued under revolving credit agreement .....	\$ 72,500,000
4% notes due in annual installments of \$2,500,000 commencing October 1, 1967 until October 1, 1985 when the balance of \$5,000,000 is due .....	50,000,000
5% convertible subordinated debentures maturing February 1, 1979 .....	2,825,500
Miscellaneous (interest rates to 6% and maturities to 1994) .....	1,920,090
	127,245,590
Installments due within one year (included in current liabilities) .....	(2,904,450)
	<u>\$124,341,140</u>

An agreement with a group of banks provides Avco a revolving line of credit of \$100,000,000 until April 15, 1970. For comparative purposes the \$25,000,000 of borrowings under this agreement which were outstanding on November 30, 1965 have been reclassified from current liabilities to long term debt in the accompanying statement of consolidated financial position.

### NOTE 3: COMMON STOCK

At November 30, 1966, Avco common stock was reserved for the following: exchange for minority interests in a subsidiary of Avco Delta Corporation, 14,510 shares; conversion of preferred stock at \$28.20 per share, 124,113 shares; and conversion of convertible debentures at \$11.50 per share, 245,695 shares. There were also reserved under a stock option plan approved by Avco stockholders 180,315 shares of common stock against which options were outstanding on 87,700 shares of which options on 54,118 shares were then exercisable. The prices of the outstanding options, which were above the market prices on the dates the options were granted, aggregate \$2,148,925 and the options expire at various dates between February 21, 1967 and July 20, 1971.

At November 30, 1965, there were reserved under the stock option plan 237,081 shares against which options on 118,866 shares were then outstanding. During the 1966 fiscal year options on 29,250 shares were granted, 56,766 shares were issued on exercise of options and options on 3,650 shares expired.

### NOTE 4: RETAINED EARNINGS

Under agreements relating to long term debt and the bank credit, approximately \$37,250,000 of Avco's retained earnings at November 30, 1966 was not restricted as to the payment of cash dividends on common stock.

### NOTE 5: INCENTIVE COMPENSATION

Under the plan approved by Avco stockholders, there is payable as incentive compensation 10% of the amount by which consolidated earnings (as defined) exceed 8% of consolidated capital (as defined), both as determined by Avco's independent auditors. Incentive compensation (included in selling and administrative expenses) amounted to \$4,915,713 in 1966 and \$3,450,138 in 1965.

### NOTE 6: PENSION PLANS

Avco has in effect non-contributory pension plans covering certain hourly employees. Unfunded past service costs, which are being funded over a period of 30 years, were approximately \$13,500,000 at November 30, 1966.



## *Consolidated Source and Disposition of Working Capital*

<b>SOURCE OF WORKING CAPITAL</b>	<i>Year ended November 30</i>	<i>Year ended November 30</i>
	<b>1966</b>	<b>1965</b>
Net earnings .....	\$32,013,631	\$24,433,287
Depreciation .....	8,808,323	7,042,338
Equity in consolidated net earnings of Avco Delta Corporation .....	(4,900,558)	(3,561,123)
	<hr/>	<hr/>
	35,921,396	27,914,502
Common stock options exercised .....	1,202,192	536,424
Increase in long term debt other than convertible debentures .....	44,659,740	62,667,488*
	<hr/>	<hr/>
<b>TOTAL</b> .....	<b>81,783,328</b>	<b>91,118,414</b>
	<hr/>	<hr/>
<b>DISPOSITION OF WORKING CAPITAL</b>		
Cash dividends declared .....	14,705,066	13,744,719
Cash investment in Avco Delta Corporation .....	10,000,000	25,093,424
Cash investment in non-finance businesses, less acquired working capital .....	4,897,158	29,484,826
Net additions to property, plant and equipment...	19,591,489	8,116,341
Increase (decrease) in other .....	1,547,724	(13,810)
	<hr/>	<hr/>
<b>TOTAL</b> .....	<b>50,741,437</b>	<b>76,425,500</b>
	<hr/>	<hr/>
<b>INCREASE IN WORKING CAPITAL</b> .....	<b>\$31,041,891</b>	<b>\$14,692,914*</b>
	<hr/>	<hr/>

\*After reclassification for comparative purposes of \$25,000,000 of notes payable under the revolving credit agreement from current liabilities to long term debt.



DETA CORPORATION

*Consolidated Financial Position*

<b>ASSETS</b>	<i>November 30 1966</i>	<i>November 30 1965</i>
Cash .....	<u>\$ 33,913,157</u>	<u>\$ 26,840,455</u>
Marketable securities, at cost (approximate market) .....	<u>333,338</u>	<u>3,337,504</u>
Receivables (including amounts due after one year)		
Retail installment .....	<u>237,440,098</u>	<u>194,422,614</u>
Loans .....	<u>179,110,320</u>	<u>132,454,248</u>
Wholesale (on Avco New Idea farm equipment).	<u>21,198,369</u>	<u>—</u>
Other wholesale and miscellaneous .....	<u>11,181,029</u>	<u>11,731,043</u>
	<u>448,929,816</u>	<u>338,607,905</u>
Unearned discount and service charges .....	<u>(51,440,572)</u>	<u>(36,623,821)</u>
Allowance for losses .....	<u>(7,574,032)</u>	<u>(5,735,400)</u>
Net receivables .....	<u>389,915,212</u>	<u>296,248,684</u>
Other current assets .....	<u>3,193,659</u>	<u>5,591,649</u>
<b>TOTAL CURRENT ASSETS</b> .....	<u>427,355,366</u>	<u>332,018,292</u>
Net assets of insurance subsidiaries (Note 1) .....	<u>6,838,249</u>	<u>5,043,085</u>
Property and equipment and deferred expenses at cost less accumulated depreciation and amortization .....	<u>3,834,819</u>	<u>3,479,662</u>
Excess of cost of investments in subsidiaries over acquired equity in net assets, being carried without amortization .....	<u>55,307,251</u>	<u>54,040,662</u>
<b>TOTAL ASSETS</b> .....	<u>\$493,335,685</u>	<u>\$394,581,701</u>

<b>LIABILITIES AND STOCKHOLDER EQUITY</b>	<i>November 30 1966</i>	<i>November 30 1965</i>
Notes payable		
Banks .....	<u>\$ 93,710,000</u>	<u>\$ 76,260,000</u>
Commercial paper .....	<u>102,930,300</u>	<u>68,219,625</u>
Long term debt installments due within one year	<u>6,820,250</u>	<u>6,630,251</u>
Savings deposits .....	<u>14,167,103</u>	<u>9,395,742</u>
Accounts payable and accrued liabilities .....	<u>7,323,770</u>	<u>4,576,714</u>
U.S. federal and Canadian income taxes .....	<u>2,571,740</u>	<u>2,205,620</u>
Dealers' reserves and holdbacks .....	<u>7,085,996</u>	<u>1,563,354</u>
<b>TOTAL CURRENT LIABILITIES</b> .....	<u>234,609,159</u>	<u>168,851,306</u>
Long term debt (Note 2) .....	<u>147,693,901</u>	<u>128,162,849</u>
Minority interest in subsidiary .....	<u>4,863,764</u>	<u>8,034,012</u>
<b>STOCKHOLDER EQUITY (Note 1)</b>		
Capital stock, no par value .....	<u>33,850,000</u>	<u>23,850,000</u>
Additional paid-in capital .....	<u>63,857,180</u>	<u>62,122,411</u>
Retained earnings (Note 3) .....	<u>8,461,681</u>	<u>3,561,123</u>
<b>TOTAL STOCKHOLDER EQUITY</b> .....	<u>106,168,861</u>	<u>89,533,534</u>
<b>TOTAL LIABILITIES AND STOCKHOLDER EQUITY</b> .....	<u>\$493,335,685</u>	<u>\$394,581,701</u>

See accompanying notes page 35.



**DELTA CORPORATION**

## *Consolidated Earnings*

	<i>Year ended November 30 1966</i>	<i>Year ended November 30 1965</i>
Interest, discount and service charges of finance companies .....	\$55,883,492	\$40,317,382
Income of insurance subsidiaries before income taxes .....	2,044,687	880,455
	<u>57,928,179</u>	<u>41,197,837</u>
 <b>Expenses</b>		
Interest and debt expense .....	17,696,951	11,715,785
Provision for losses on collection of receivables .	6,345,177	5,211,588
Other operating expenses (including deprecia- tion of \$552,959 in 1966 and \$323,558 in 1965) .....	23,010,756	16,197,948
U.S. federal and Canadian income taxes .....	5,587,853	4,045,854
	<u>52,640,737</u>	<u>37,171,175</u>
Earnings before minority interest .....	5,287,442	4,026,662
Preferred stock dividends paid by subsidiary .....	386,884	465,539
	<u>4,900,558</u>	<u>3,561,123</u>
 <b>NET EARNINGS</b> .....	3,561,123	—
Retained earnings at the beginning of the year .....	3,561,123	—
Retained earnings at the end of the year (Note 3) ..	<u>\$ 8,461,681</u>	<u>\$ 3,561,123</u>

### **NOTE 1: PRINCIPLES OF CONSOLIDATION**

Avco Delta Corporation is a wholly-owned subsidiary of Avco Corporation. Avco assists Avco Delta in arranging and obtaining financing, and Avco Delta purchases wholesale receivables acquired by Avco in the sale of farm equipment; in all other material respects the operations of Avco Delta are separate and distinct from those of Avco.

The consolidated financial statements of Avco Delta include the accounts of all subsidiaries except insurance companies; combined assets (\$16,099,705) less combined liabilities (\$9,261,456) of insurance companies are shown separately in the statement of consolidated financial position and their income before income taxes is shown separately in the statement of consolidated earnings.

Canadian dollar amounts have been translated at the established rate of exchange of \$1 Canadian = \$.925 U.S. At November 30, 1966, \$210,960,996 of current assets and \$15,072,744 of current liabilities and long term debt were represented by accounts to be settled in Canadian funds.

During 1966, Avco acquired a portion of the minority interest in a subsidiary of Avco Delta and contributed the shares at its cost of \$1,734,769 to the additional paid-in capital of Avco Delta. Shares of Avco Delta's capital stock were sold to Avco during the year for \$10,000,000 cash.

### **NOTE 2: LONG TERM DEBT**

At November 30, 1966, long term debt consisted of:	
Senior notes payable—5% to 6½% maturing annually to October 1, 1981 .....	\$107,863,500
Senior subordinated notes payable—4½% to 6½% maturing annually to Sept. 1, 1981 .....	28,531,563
Junior subordinated notes payable—5½% to 6¾% maturing annually to November 15, 1980 .....	17,982,188
Sinking fund debentures—5½% due March 1, 1968 .....	136,900
Installments due within one year (included in current liabilities) .....	154,514,151
	<u>(6,820,250)</u>
	<u>\$147,693,901</u>

At November 30, 1966, Avco Delta had firm commitments from lenders for the placement of \$60,510,000 of long term debt; \$33,960,000 in 1967 and \$26,550,000 in 1968.

### **NOTE 3: RETAINED EARNINGS**

Under the agreements relating to the notes payable approximately \$7,400,000 of Avco Delta's retained earnings was not restricted as to the payment of cash dividends on capital stock.



## Five Year Financial Review

### EARNINGS STATISTICS

<i>Year ended Nov. 30</i>	<i>Net sales</i>	<i>Earnings before income taxes</i>	<i>U.S. federal and Canadian income taxes</i>	<i>Net earnings</i>	<i>Net earnings per share of common stock</i>	<i>Cash dividends per share of common stock</i>
<b>1966</b>	\$604,219,545	\$57,013,631	\$25,000,000	\$32,013,631	\$2.30	\$1.05
<b>1965</b>	443,194,878	44,333,287	19,900,000	24,433,287	1.78	1.00
<b>1964</b>	431,075,716	44,544,540	21,900,000	22,644,540	2.05	1.00
<b>1963</b>	514,132,435	46,792,997	24,360,000	22,432,997	2.00	.80
<b>1962</b>	414,280,128	41,037,265*	20,997,000*	20,040,265*	1.83*	.67½

\*Profit on the sale of substantially all of the assets of Crosley Broadcasting of Atlanta, Inc. increased earnings before income taxes by \$1,696,989, U. S. federal income tax by \$447,000 and net earnings by \$1,249,989 or \$.11 per share.

### FINANCIAL POSITION STATISTICS

<i>Nov. 30</i>	<i>Working capital</i>	<i>Common stockholders' equity</i>	<i>Common stockholders' equity per share</i>
<b>1966</b>	\$164,682,873	\$249,425,817	\$17.87
<b>1965</b>	133,640,982	228,187,297	16.62
<b>1964</b>	118,948,068	155,956,048	14.30
<b>1963</b>	128,991,575	155,698,969	13.80
<b>1962</b>	117,617,964	139,696,647	12.62



**AVCO** CORPORATION 750 THIRD AVE., NEW YORK, N. Y. 10017



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BACKGROUND MEMORANDUM ON  
AVCO INTRA-AORTIC BALLOON PUMP

In 1966 Dr. Kantrowitz and his staff at Avco Everett Research Laboratory joined in an effort with Dr. W. Gerald Austen and his associates at the Massachusetts General Hospital to develop an intra-aortic balloon pump system to treat massive heart attack (myocardial infarction) and resultant cardiogenic shock.

The Avco-MGH developed cardiac assist system consists of an external drive and control console and a slim, long, patented\* multi-segment balloon made of "Avcothane", a blood compatible material developed by Avco.

The balloon is introduced into the patient's aorta, the major artery leading from the heart, through a small incision made in the femoral artery in the thigh.

Electrocardiogram (EKG) electrodes on the patient's chest feed signals to an electronic computer circuit in the console. This triggers the action to pump gas in and out of the balloon in precise counterpulsation synchronized with the patient's heart rhythm.

While the heart is at rest (diastole) pumped helium gas expands the balloon moving blood down the aorta and through the body. The back pressure also forces blood into the coronary arteries feeding the

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\*Patent number 3,504,662



heart muscle, as well as assisting in closing the aortic valve to prevent backflow into the left ventricle. As the heart begins to contract (systole) the balloon deflates rapidly, leaving a low pressure area into which a damaged heart can pump easily thereby reducing the heart's workload.

After a period of recovery the balloon can be removed. If additional pumping is indicated the balloon can be reinserted for another therapeutic period.

#### History

The technique of balloon pumping was first proposed in 1962 by Drs. Kolff, Moulopoulos, and Topaz at the Cleveland Clinic as a method to aid some of the more than a million and a half Americans who each year are victims of heart attacks.

Among the earliest investigators and enthusiasts of counterpulsation was Dr. Arthur Kantrowitz, Vice President and Director of Avco Corporation and Director of Avco Everett Research Laboratory.

During the past decade the Laboratory has investigated a number of heart assist devices. Its research and development activities also included studies of the fluid dynamics of blood clotting and blood compatible materials.

In 1966, Avco and the Massachusetts General Hospital engaged in a close-working clinical and engineering partnership to develop an intra-aortic balloon pump system.

#### Balloon Design

A team of scientists, engineers and technicians at the Avco Everett Research Laboratory have applied their extensive background in fluid mechanics and other disciplines to theoretical and experimental development of a successful balloon design.



There are two important features of intra-aortic balloon design that deal with the mode of expansion and contraction.

The mode of inflation peculiar to a single segment balloon is for the balloon ends to inflate before the center. The balloon assumes a "dumbbell" shape once the ends are inflated and blood is trapped between them. Balloon effectiveness is decreased because trapped blood merely expands the section of the aorta between the balloon ends and is not pumped to the rest of the body. Furthermore, stress is placed on this region of the aorta by undue expansion.

To overcome these effects, Avco designed and patented a multi-segment tapered balloon in which the center segment inflates first forcing blood in both directions, as required, without undue stress on the aortic wall.

The three most general problems of internal circulatory devices are thrombosis (formation of internal blood clots), red cell destruction and destruction of other blood elements such as white cells and platelets. In regard to these problems, extensive clinical trials have resulted in no serious blood changes.

Also careful pathological study on the aorta in the region of the balloon has disclosed no detectable damage to the aortic wall.

#### Materials Development

In the evolution of rigid standards for balloon materials, consideration was given to such criteria as fatigue characteristics, stress loads, diffusion rates and pressure transmission properties to achieve reliable, safe operation. A new copolymer named "Avcothane," synthesized over the course of the last four years by a special research and development



team at Avco Everett, exhibits all of the desired performance parameters with no tendency to induce clots or damage blood elements. Balloons constructed of "Avcothane" are tested at pressures and for durations in excess of any contemplated use and the equipment has been used in 38 patients without malfunction.

#### Console Design

A reliable, pumping module must respond precisely and instantly to the demand signals generated by the electrocardiogram (EKG). The Avco system is designed so that pumping is monitored and automatically controlled. Further adjustments, once the balloon is inserted, may be made but are not usually required. When the cardiac rhythm is abnormal, the circuitry identifies the activating EKG signal and maintains proper pump timing despite changes in heart rate.

To protect against accidental balloon leakage, an isolating piston separates the higher driving pressure in the console from the helium in the balloon. This small volume of helium is monitored constantly to detect even the smallest deviation from preset levels. If a leak occurs in the balloon, the console immediately shuts down and vents the balloon to a safe condition.

Serious change in patient condition, equipment malfunction, system leaks, power failure or change in pump stroke and helium volume beyond preset limits all cause the balloon to vent instantly to the atmosphere. An alarm is sounded giving status indication. The patient is also completely isolated from electrical circuitry and the system has a self-contained battery power supply for use during power failure or for portable operation.



The Avco System thus contains a fail-safe abort mechanism which constantly matches the patient's requirements and takes into account both momentary and long-term variations within the treatment period.

#### Clinical Results

To date 38 patients who were in refractory shock and thought to have no chance for recovery with standard forms of treatment have been treated with the Avco-MGH developed balloon pump for periods of one to 12 days. Standard treatments were carried out for several hours before counterpulsation was begun. The symptoms of cardiogenic shock and dangerous changes in heart rhythm, called cardiac arrhythmias, tended to clear up rapidly after counterpulsation with the balloon. Eight patients still survive and have been discharged, five from MGH and three from other hospitals.

Studies also show that the balloon pumping technique might be used for temporary support of patients who need more definitive treatment, such as major cardiac reconstructive surgery.

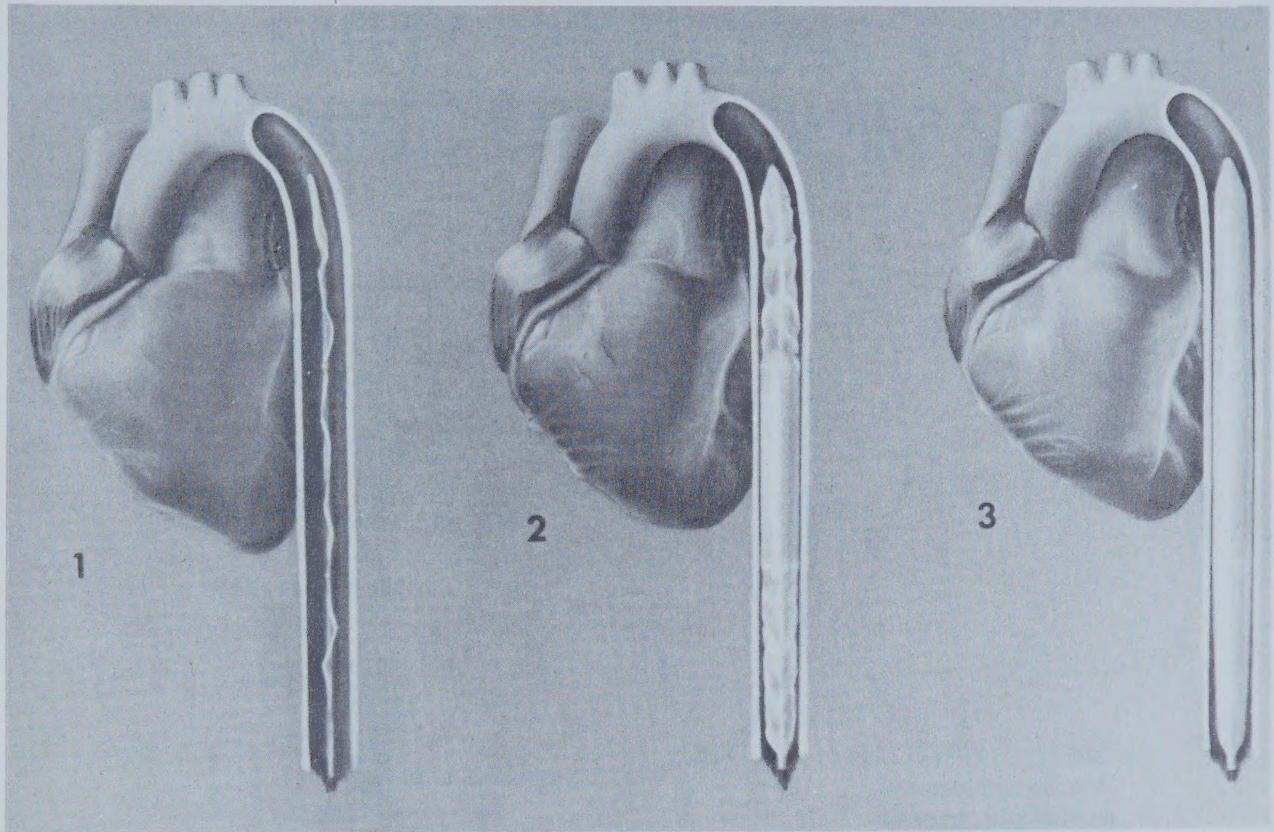
One such use of the balloon has recently been demonstrated at the Massachusetts General Hospital and reported in the New England Journal of Medicine, 17 December 1970. A patient who suffered a myocardial infarction and went into cardiogenic shock was balloon pumped for a period of three days. He responded well to the balloon and continued to improve. Three weeks later he suffered a new heart attack and pressures again began to fall and evidence of new heart damage appeared. The balloon was reintroduced and the heart was catheterized to determine if the patient's condition could be improved operatively. The patient was then moved directly to the operating room where a coronary revascularization, a procedure in which the heart's own arteries are by-passed, was



begun. The intra-aortic balloon remained in operation until all preparation had been made and the blood-oxygenator started. The patient responded well to the operation and was discharged from the hospital.

Groups at Boston City Hospital, New York Hospital, Boston University, University of California at San Diego, University of Chicago and Jewish General Hospital in Montreal have been equipped with Avco-MGH systems and have three surviving patients.



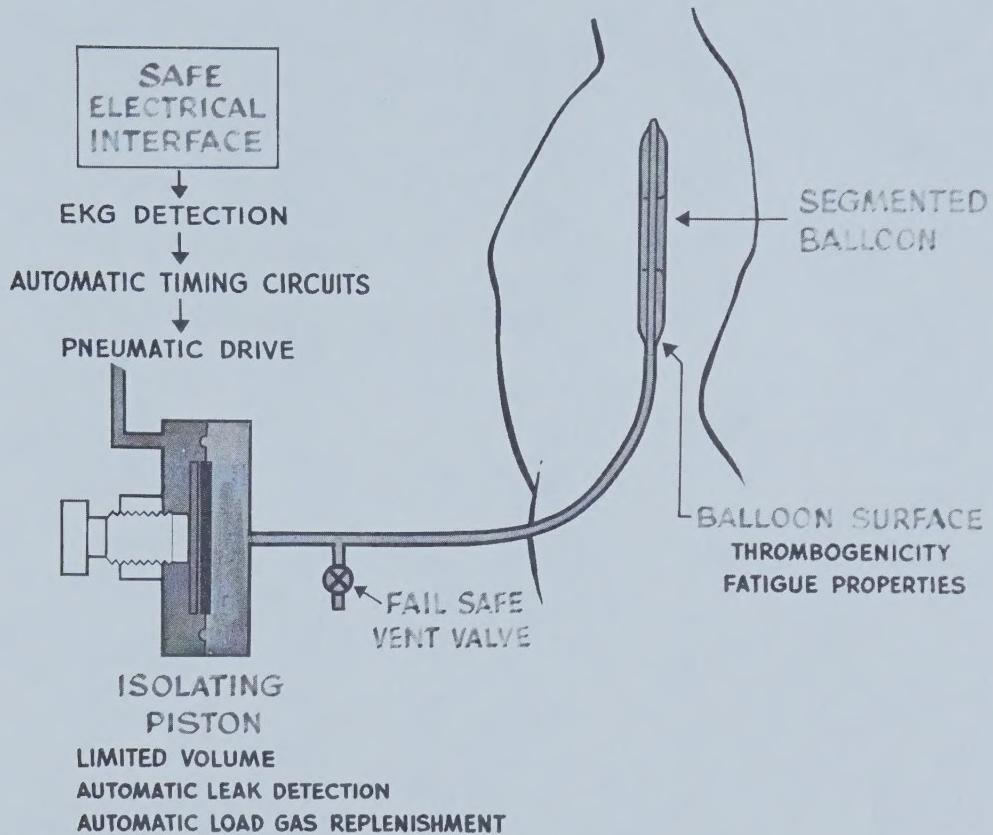


#### AVCO-MGH INTRA-AORTIC BALLOON PUMP

1. The heart contracts, pumping blood into the aorta. The balloon is deflating.
2. The heart begins to relax; the aortic valve is closed. The balloon is expanding, forcing blood into both the upper and lower body.
3. The heart is fully relaxed, the balloon fully inflated. As the heart begins its next cycle, the balloon deflates, leaving a low-pressure area into which the heart easily pumps.



# SAFETY PRECAUTIONS FOR INTRA-AORTIC BALLOON PUMPING SYSTEM



To protect against accidental balloon leakage, an isolating piston separates the higher driving pressure in the console from the helium in the balloon. This small volume of helium is monitored constantly to detect even the smallest deviation from preset levels. If a leak occurs in the balloon, the console immediately shuts down and vents the balloon to a safe condition.

